

Paunsaugunt boreal toad habitat improvement project

Project ID: 3631

Status: Current

Fiscal Year: 2017

Submitted By: N/A

Total Acres: 67

Project Manager: Michael Golden

PM Agency: U.S. Forest Service

PM Office: Dixie National Forest

Lead: U.S. Forest Service

WRI Region: Southern

Description:

Aspen regeneration cuts on 59 acres. Protect aspen regeneration on 86 acres of recent aspen coppice cuts and willow regeneration on 29 acres of riparian habitat through domestic and wild ungulate fencing along the headwaters of the East Fork Sevier River and Upper Kanab Creek. Repair Blubber Creek outflow to maintain 2 acres of potential boreal toad breeding habitat. Plant willows on 18 acres of riparian area where willow regeneration is problematic. Build three beaver dam analogues.

Location:

The project will encompass multiple locations along the headwaters of the East Fork Sevier River and Upper Kanab Creek south of Tropic Reservoir in Kane County.

PROJECT NEED

Need For Project:

In 2011 an "Eastern population" of boreal toad that would include all Utah boreal toad populations was petitioned for listing under that Endangered Species Act (Greenwald, Adkins Giese, Mueller, & Molvar, 2011). The petitioners presented arguments that 1) the "present or threatened destruction, modification, or curtailment of the boreal toad's habitat or range" (specifically timber management, livestock grazing, pesticide application, water management, recreation, residential and commercial development, and road building) 2) chytrid fungus, a world-wide pathogen of amphibians, and 3) the "Inadequacy of Existing Regulatory Mechanisms" are factors that warrant listing the "Eastern population" of boreal toad as Threatened or Endangered under the Act. The petition also cites multiple peer-reviewed genetic studies indicating that all, or portions of, the "Eastern population" was/were "evolutionarily significant" and could be considered one, or multiple, Distinct Population Segments (DPS). In 2012 Fish and Wildlife Service issued a 90 day finding that the petition warranted a 12 month status review (77 FR 21920, 2012). Fish and Wildlife Service is expected to issue its 12 month status review and Listing Decision on boreal toad by the close of FY 2017.

The Paunsaugunt population of boreal toad is the southernmost population in Utah, is isolated from other boreal toad populations and has been found to be genetically unique by multiple genetic studies (Hogrefe, 2001; Goebel, 2005; Goebel, Ranker, Corn, & Olmstead, 2009; Switzer, Johnson, Lubinsky, & King, 2009). Viewing all these factors together it appears the Paunsaugunt population of boreal toad could meet the Discreteness and Significance factors needed to qualify for DPS status under the Endangered Species Act (66 FR 4722, 1996).

Since visual encounter surveys for boreal toad first began on the Paunsaugunt Plateau in the mid-1990s the population appears to have undergone a substantial decline. Both the abundance and distribution of juvenile and adult toads appears to have declined and documented breeding activity and breeding areas have also been reduced (Fridell, Comella, Garnett, Zettle, Smith, & Harstad, 2000; Golden, 2012; Wheeler, Fridell, & Golden, 2013; Wheeler K. , Fridell, Swensen, & Golden, 2015). The Boreal Toad Conservation Plan in the State of Utah defines viable populations as having breeding, recruitment, and multiple age classes observed at a minimum of three breeding sites in three of the past five years. The Paunsaugunt Plateau population has not met these viability conditions for over a decade. The primary reasons for the decline in the Paunsaugunt population are probably a combination of pathogen infection and habitat degradation. The population has tested positive for chytrid fungus (*Batrachochytrium dendrobatidis*) which has caused reduced survival and population declines in other boreal toad populations within the Intermountain West (Muths, Corn, Pessier, & Green, 2003; Pilloid, et al., 2010). In addition to infection by chytrid fungus boreal toad breeding habitat on the Paunsaugunt Plateau began to decline in the 2000s. A probable result of the combination of these two factors has been that documented breeding has only occurred in two locations on the Plateau for over 10 years (Golden, 2012; Rodriguez, 2012; Wheeler, Fridell, & Golden, 2013; Wheeler K. , Fridell, Swensen, & Golden, 2015). Historic management on the Paunsaugunt Plateau led to dramatic declines in riparian woody browse (particularly willow) over what was known prior to colonization by white settlers. Damage to upland and riparian vegetation led to downcutting and channel incision throughout the headwaters of the East Fork Sevier River drainage. The uplands of the drainage were terraced and grade controls structures were installed on streams throughout the drainage. Despite these efforts there are still some areas with active head cutting and many areas where the incised channel is disconnected from the historic floodplain on the first terrace. While greenline vegetation inventories in the drainage show stable, late seral vegetation communities current domestic and wild ungulate use have slowed riparian woody browse recruitment in some areas.

Historically boreal toad breeding habitat on the Paunsaugunt Plateau was comprised almost entirely of beaver ponds. Research in other locales has demonstrated the importance of beaver ponds as breeding habitat for boreal toad and other pond breeding amphibians, particularly when other lentic wetlands are limited or unavailable (Semlitsch, 2000; Holland, Wilson, & Jones, 2006; Stevens, Paszkowski, & Foote, 2007). In the early 2000s a combination of lethal removal of beaver and shortages in woody browse probably led to relatively long-term beaver dam complexes being abandoned. After abandonment the ponds in these complexes began to deteriorate as they silted in and their dams became breached, all of which resulted in a dramatic reduction of breeding habitat available to boreal toad on the Plateau (see image attachments). Beaver reintroductions under the State of Utah's Beaver Management Plan immediately adjacent to the current breeding site within the boreal toad enclosure on the East Fork Sevier River in 2012 have been successful at revitalizing several old beaver dams in that area, as well as expanding beaver activity downstream to Podunk Guard Station (see image attachments). While the State of Utah's Beaver Management Plan has identified the headwaters of the East Fork Sevier River and Upper Kanab Creek as priority translocation areas for beaver, concerns over the amount of available preferred forage (aspen, cottonwood, willow) have prevented additional translocations to this area. A recently developed Beaver Restoration Assessment Tool (BRAT) modeled vegetation conducive to building beaver dams within 30m and 100m buffers along perennial streams in southern Utah (Macfarlane, Wheaton, & Jensen, 2014; MacFarlane, Bouwes, Jensen, Gilbert, Hough-Snee, & Shivik, 2015). This model assigned a rank from 0-4 (0 being unusable and 4 being preferred for dam building) to vegetation along 250m long stream segments throughout Utah using Landfire 2011 data, a nationwide 30 m Landsat satellite imagery-based landcover classification system. Landfire 2011 developed quantitative state-and-transition models to estimate "reference" conditions for vegetation communities termed "Biophysical Settings" (Swetnam & Brown, 2010) (<http://www.landfire.gov/NationalProductDescriptions24.php>). BRAT used these Biophysical Settings to create a potential for dam building vegetation material to compare against what currently exists for each 250m stream segment. Data from perennial streams in the Headwaters East Fork Sevier River 6th field HUC watershed (160300020301) indicate that within a 30m distance from the stream the mean value for existing woody vegetation for dam building is nearly a full categorical point lower than the mean potential value (2.1 versus 3.0), indicating that riparian woody browse could be improved to increase the potential for beaver recolonization success throughout this watershed. In the current Brat model a score of 2 would indicate that vegetation is available to allow for occasional dams (2-4/km) while a 3 indicates vegetation is available for frequent dams (5-15/km).

In 2012 the Dixie National Forest issued a Decision to treat vegetation on the Paunsaugunt Plateau through the Paunsaugunt Vegetation Management Project. The project highlighted the departure of the existing condition of aspen and mixed conifer stands from the desired condition on portions of the Paunsaugunt Plateau. Improving aspen regeneration, creating and maintaining conditions that promote growth and vigor of forest stands while reducing mortality from fire, insects and disease and improving and maintaining a balance of age structure classes and desirable tree species within forest stands were needs identified by the environmental analysis for this project. Both aspen coppice cuts and shelterwood regeneration harvest proposed in this project should improve aspen regeneration and recruitment in the targeted stands. Aspen regeneration in stands adjacent to potential beaver habitat is important for aquatic habitat and boreal toad breeding habitat improvement because aspen is a preferred food source and dam building material for beaver.

Since 2008 UDWR has worked with various groups (currently known as the Paunsaugunt Plateau Boreal Toad Conservation Partners) to establish Captive Refuge Populations of boreal toad (Wheeler K. , 2013). Part of this captive population development has involved releasing excess metamorphs back onto the Paunsaugunt Plateau in suitable habitat. The first such release was into a pond that is fenced to protect wildlife on Blubber Creek.

Northern leopard frogs are known to occur in this pond and 84 metamorphs were released there in 2008. The first documentation of boreal toad at this pond occurred during 2015 breeding and inventory surveys when one adult toad was observed (UDWR unpublished data). As part of efforts to improve the distribution and abundance of Paunsaugunt boreal toad captive rearing and reintroduction and/or translocation of eggs, tadpoles, metamorphs or adults are likely to become more commonplace. As such maintaining and improving appropriate reintroduction habitat will be important. During high flows in 2011 the outlet channel on the Blubber Creek pond began to fail, threatening the integrity of the entire grade control structure that maintains the pond (see attached images). The Dixie National Forest replaced the outlet and the outlet channel in 2014; however, monsoon storm flooding compromised the integrity of grade control structures in the outflow channel before bank stabilizing vegetation could become established.

In order to maintain and improve boreal toad abundance and distribution on the Paunsaugunt Plateau there is a need maintain and expand existing potential boreal toad breeding habitat on the Paunsaugunt Plateau. This project proposes some short-term actions to improve boreal toad breeding habitat on the Paunsaugunt Plateau including: 1) protecting and improving woody browse (aspen and willow) to maintain the current beaver population and encourage beaver expansion 2) experimenting with beaver dam analogues to re-elevate the floodplain, maintain the current beaver population and encourage beaver expansion and maintain current boreal toad breeding habitat, 3) repair the outflow channel on Blubber Creek to maintain current potential breeding habitat and a future reintroduction site. In concert with actions taken to improve livestock management, reduce resource impacts from recreation and transportation systems, improve riparian vegetation and facilitate aquatic organism passage over the past 20-30 years it is hoped that these short-term actions will help alleviate the factors that would warrant listing boreal toad or the Paunsaugunt Plateau population of boreal toad, under the Endangered Species Act.

Objectives:

The overall goal of the project is to improve and expand boreal toad breeding habitat on the Paunsaugunt Plateau. Improving habitat for the Paunsaugunt Plateau population should improve the status of a genetically unique population of boreal toad which supports the WRI arm to enhance Utah's Wildlife and Biological Diversity. In the short-term this goal can be met by the following objectives: 1) protecting and maintaining current breeding habitat and 2) maintaining and expanding the distribution of beaver on the Paunsaugunt Plateau. In order to accomplish these objectives woody riparian browse recruitment and associated upland aspen recruitment needs to be protected/improved in order to maintain and expand the existing beaver population on the Paunsaugunt Plateau.

Since the project endeavors to improve woody browse via harvest and encourage beaver use and expansion within the watershed, specific components of the project support the Water Quality and Yield for all Uses and Opportunities for Sustainable Uses legs of the Watershed Restoration Initiative. In addition to improving aquatic habitat for beaver and breeding habitat for boreal toad, the project has objectives to reduce channel incision and reconnect the floodplain which should lead to increases in stream channel habitat complexity. Currently the streams within the proposed project area support a mixture of nonnative trout species; however, streams within the project area are planned for Bonneville cutthroat and southern leatherside restoration within the next five ten years so an ancillary objective is to improve instream habitat prior to those restoration efforts.

Measurable objective Aspen fencing: We propose to protect three forest stands, immediately adjacent to known historic beaver use areas along Mill Creek and the East Fork Sevier River near the Mill Creek confluence, that have been recently treated to promote aspen regeneration until stands are deemed stocked. Stands will be deemed stocked when they reach an average of 500 stems per acre and stems average 6 feet in height.

Measurable objective Aspen coppice cuts: Complete aspen coppice cut on 31 acres and fence following completion until stands are deemed stocked. Stands will be deemed stocked when they reach an average of 500 stems per acre and stems average 6 feet in height.

Measurable objectives shelterwood harvest: Vegetation objectives within the ponderosa pine and mixed conifer forest stands are to improve growth and species composition and to reduce surface and ladder fuels and return stands to a FRCC 1 (within range of historic variation) following treatments.

Measurable objective Temporary Experimental Riparian fencing: Improve the density and height of willow stems within exclosure areas. A forest interdisciplinary team is currently developing woody browse objectives for these exclosures.

Measurable objectives Beaver Dam Analogues: a) Reevaluate the floodplain in incised areas immediately adjacent to riparian woody browse that could facilitate beaver expansion on the East Fork Sevier near the Mill Creek and Seiler creek confluence areas. b) Left Fork Kanab creek exclosure -- Maintain and improve wetted area available for boreal toad breeding, as well as maintaining continued breeding at this site. The Left Fork Kanab Creek upper pond has been the most productive breeding site on the Paunsaugunt Plateau for the past three years; however, the amount of habitat at this location has been declining annually since major dam breaching in 2010-2011 (see attached images). Maintaining or expanding water levels behind the existing dam with a beaver dam analogue will protect a key breeding area for boreal toad.

Measurable objectives willow plantings: a) Left Fork Kanab Creek exclosure -- Improve willow stem density on 14 acres within the Left Fork Kanab Creek exclosure with a goal of 10 stems per m² over 10 acres of the planting area. b) Garkane land purchase parcel - Improve willow stem densities and bank stability along slightly more than 0.5 miles (~ 3 acres) of Upper Kanab Creek, the Middle Fork of Kanab Creek and Left Fork of Kanab Creek, as well as halt head cut advancement on Upper Kanab Creek near the confluence of the Middle and Left Forks of Kanab Creek. c) Blubber Creek -- In addition to planting along the channel reconstruction/repair discussed below the project would also improve willow stem density on 1 acre downstream from the channel outlet with a goal of 10 stems per m².

Measurable objectives Blubber Creek- Maintain grade control and establish riparian vegetation on Blubber Creek outflow channel.

Threats / Risks:

As described under the purpose and need the Paunsaugunt population of boreal toad is genetically unique and is isolated from other boreal toad populations in the Intermountain West, which elevates its potential to be seen as a Distinct Population Segment by U.S. Fish and Wildlife Service. The Paunsaugunt population is also known to be infected with chytrid fungus and has undergone fairly large declines in numbers of adults/juveniles, breeding activity and distribution since the 1990s (Rodriguez, 2012; Golden, 2012; Wheeler K. , Fridell, Swensen, & Golden, 2015). This population has not met the viability definition laid out in the State of Utah's Conservation Plan for the species in more than 10 years. Without continued improvements to habitat for this population there is a real possibility of continued population decline and potentially local extirpation. Ongoing habitat improvement projects (including those in this proposal) and conservation actions being completed by multiple partners have the potential to reverse this trend. Without such conservations actions the Paunsaugunt population might also be found warranted for listing as a threatened or endangered Distinct Population Segment. Were the population listed it would threaten future management and "Opportunities for Sustainable Uses" such as livestock grazing, timber management and recreation.

Riparian vegetation condition has slowly been improving on the Paunsaugunt Plateau. Results of Riparian Level III greenline vegetation surveys across in the watersheds upstream from Tropic Reservoir generally show that riparian vegetation is meeting Forest Plan objectives with a stable or improving trend. That being said woody browse recovery on the Plateau has been slow and in some areas woody browse is struggling to establish. Similarly, most of the streams in the watershed have undergone channel downcutting from historic management. In some areas there is continued erosion related to that downcutting and many areas remain

disconnected from their historic floodplain. The current beaver population has improved woody browse regeneration and reconnected the floodplain in several areas between Podunk Guard Station and Sieler Creek on the East Fork Sevier River and could continue to expand as long as there is woody browse to support them. The BRAT model shows that woody browse building materials are below their potential throughout most of the drainages upstream from Tropic Reservoir, so there is a risk that the current beaver population will not be able to maintain or expand without woody browse improvement project such as those proposed in this project. Reconnecting streams to their floodplain using human constructed grade controls can cost hundreds of thousands of dollars per stream miles; whereas beaver in a landscape with healthy riparian vegetation are essentially free stream restoration (Pollock, Lewallen, Woodruff, Jordan, & Castro, 2015). The two large grade control structures on Blubber Creek protect and maintain a large wet meadow complex upstream. Without repairs to the outflow channel there is a risk that grade control structure will fail draining the pond/wetland immediately upstream. Failure of the lower structure threatens the integrity of the upper structure and the large wet meadow complex.

Relation To Management Plan:

Utah's Wildlife Action Plan:

The goal/purpose of Utah's Wildlife Action Plan is to "To manage native wildlife species and their habitats, sufficient to prevent additional listings under the Endangered Species Act." As discussed under the "Need for project" section, the Paunsaugunt Plateau population of boreal toad appears to fit the criteria that could lead to it being evaluated as a Distinct Population Segment under the current petition to list an "Eastern population" of boreal toad as threatened or endangered under the Endangered Species Act.

The WAP has an objective to reduce the scope and severity of channel downcutting for aquatic forested and riverine habitat habitat. It also identifies the following conservation actions to achieve these objectives: 1) Adjust grazing practices per the grazing principles of timing, duration and intensity to improve conditions of habitat, water and wildlife. 2) Restore aquatic habitat complexity. 3) Restore floodplain connectivity. 4) Increase cover and extent of native riparian vegetation by restoring beaver on the landscape where social and environmental factors permit (per beaver Restoration Assessment Tool). By using temporary fencing, riparian plantings, aspen treatments and beaver dam analogues to improve browse and other site conditions for beaver maintenance and expansion, this project addresses all these conservation actions recommended by the WAP. The WAP also identified aspen-mixed conifer as a key terrestrial habitat with improper livestock and wild ungulate browsing, as well as inappropriate fire frequency/intensity identified as threats. Conservation Actions recommended to address these threats include: 1) Adjust grazing practices per the grazing principles of timing, duration and intensity to improve conditions of habitat, water and wildlife. 2) Increase cover and extent of native riparian vegetation by restoring beaver on the landscape where social and environmental factors permit (per beaver Restoration Assessment Tool). 3) Conduct upland vegetation treatments to restore characteristic upland vegetation and reduce uncharacteristic fuel types and loadings. By conducting an aspen coppice cut, a conifer shelterwood harvest, constructing temporary fencing, planting willow and creating beaver dam analogues this project addresses all these conservation actions recommended by the WAP.

Dixie National Forest Land Resource Management Plan (as amended)-

Goal 14 -- Improve the quantity and quality of aquatic habitats through direct habitat improvement and increased coordination with other land use programs (page IV-5). Aquatic habitat quality will be improved by beaver dam analogues and beaver expansion as highlighted in the Project Need and Objectives section.

Goal 15 -- Maintain or enhance the terrestrial habitat for all wildlife species presently on the Forest (page IV-5). Improved riparian browse via willow plantings and temporarily fenced areas will improve willow browse for wild ungulates in the long-term. Additionally protecting recently completed aspen coppice cuts and completing an additional aspen coppice cut and

Goal 17 -- Managed Classified Species habitat to maintain or enhance their status through direct habitat improvement and agency cooperation (Page IV-6). This project has the potential to benefit boreal toad, and future restoration efforts for Bonneville cutthroat trout and southern leatherside, all three of which are Intermountain Region Sensitive species and managed under Conservation Plans or Agreements that both DWR and the Forest Service are signatories or involved partners.

Goal 32 -- Design and implement practices on the ground that will reestablish acceptable soil, hydrologic and vegetative conditions that are sufficient to secure and maintain favorable water flow (Page IV-9). As highlighted under the Water quality and quantity section the riparian improvements and maintained and expanded beaver habitat should result in an elevated water table and more consistent water storage and release.

Boreal Toad Conservation Plan for the State of Utah:

The goal of the Boreal toad Conservation Plan is to "maintain or restore multiple, viable breeding populations in nine of the 14 mountain ranges or geologic areas in Utah where boreal toad historically occurred ." The Plan identifies seven key Conservation Strategies including: "Identify and reduce threats from habitat loss and degradation (Habitat Management)," and "Restore populations in suitable historic and potential habitats." The proposed project will work to improve current breeding habitat in the East Fork Sevier River and Upper Kanab Creek drainages and to expand breeding habitat to other portions of these drainages through improving riparian and adjacent upland browse communities and encouraging beaver maintenance and expansion.

Boreal toad Captive Management Plan for the Paunsaugunt Plateau Population:

Objective 5:" Introduce offspring of captive population to supplement the wild population...". The intent of all actions proposed in this project are to expand breeding habitat for boreal toad which should provide additional areas for population supplementation, the Blubber Creek channel repair/reconstruction and willow plantings around Blubber Creek are specifically to address maintaining and improving a previously used repatriation site.

UTAH STATEWIDE BEAVER MANAGEMENT PLAN

The overall goal of the plan is to "Maintain healthy, functional beaver populations in ecological balance with available habitat, human needs, and associated species." Population Management Objective 1: Maintain reproducing beaver populations within their current distribution in appropriate habitat through 2020.

Watershed Restoration Objective 1: Work to improve riparian habitats associated streams and wetlands in a minimum of 10 tributaries through translocating beaver into unoccupied suitable habitat on public and/or private land by 2020. Strategy 9) Encourage land management agencies and private landowners to manage riparian habitat to support translocated beaver populations. The 2012 translocation of beaver into the East Fork Sevier River on the Paunsaugunt Plateau was the first in the Southern Region under the State's Beaver Management Plan and has contributed to Population Management Objective #1 and Watershed restoration Objective #1 listed above. The willow plantings, riparian and aspen unit fencing, aspen regeneration treatments and beaver dam analogues proposed in this project all work toward the outcome of Strategy 9 listed above.

UTAH MULE DEER STATEWIDE MANAGEMENT PLAN

The project meets Habitat Objective 2 to improve the quality and quantity of vegetation for mule deer habitat (p. 19). Specifically the strategy to improve aspen communities that provide crucial summer habitat by increasing regeneration and reducing conifer encroachment.

UTAH ELK STATEWIDE MANAGEMENT PLAN

This project meets Habitat Objective 2 to improve the quality and quantity of forage and cover of elk habitat with an emphasis on calving habitat (pp. 14-15). Specifically strategies to improve aspen communities on summer ranges which provide crucial calving habitat and to manage forests in early successional stages through the use of logging.

****Note that this project area is historic habitat for the following two species; however, a Bonneville cutthroat trout brood stock is being developed in ponds within the project drainages and southern leatherside are currently present below Tropic Reservoir. The Bonneville cutthroat trout Southern GMU Team is planning to implement a nonnative trout removal project in the entire drainage upstream from Tropic Reservoir beginning within the next five years. After nonnative trout removal both BCT and southern leatherside will be restored to the project area. After these species are restored the proposed activities in this project will contribute toward the objectives listed below.

Range-wide Conservation Agreement and Strategy for Bonneville cutthroat trout (Lentsch et al. 2000):

Strategy Objective II A) 1) Maintain or restore water quality to a degree that provides for stable and productive riparian and aquatic ecosystems;

2) Maintain or restore stream channel integrity, channel processes, and the sediment regime (including the elements of timing, volume, and character of sediment input and transport) under which the riparian and aquatic ecosystems developed;

5) Maintain or restore the diversity and productivity of desired plant communities in riparian zones;

6) Maintain or restore riparian vegetation to: c) help achieve rates of surface erosion, bank erosion, and channel migration characteristic of those under which the communities developed;

Conservation Agreement and Strategy for southern leatherside (*Lepidomeda aliciae*) in the State of Utah (UDWR 2010):

Objective 3 - Identify, prioritize, and implement actions to reduce threats to southern leatherside populations and habitat and evaluate the effectiveness of these actions.

Conservation Element B) 2) - Restore habitat where possible, creating habitat complexity and connectivity for southern leatherside.

Conservation Element B) 3) - Implement habitat enhancements that may include some or all of the following: removal of diversion structures, modification of barriers to allow fish passage, bank stabilization, enhancement of native vegetation, riparian fencing, nonnative removal and implementation of compatible grazing practices.

Conservation Element D) 4) -- Maintain natural hydrologic conditions.

Fire / Fuels:

1) Aspen and conifer treatments - Currently the stands within the proposed treatment area can be classified as an FRCC 2 or 3 where the conditions are moderately to highly departed from historic vegetation conditions. Dense stands of conifers with high surface fuel loading have an associated risk of high severity fire. A wildfire in the current environment would transition into the crowns potentially creating large areas of high tree mortality and degrading habitat for goshawk, mule deer and other ungulates for many years. High fire severity may also impact beaver dams and fisheries through large sediment dumps from denuded hillsides. Bryce Canyon National Park adjacent to the project area is at risk of high severity fire crossing into the park, impacting visitor safety and park resources. Thinning climax species results in removing ladder fuels which reduces total fuel loading and promotes regeneration of seral species. Piling natural and activity fuels reduces fuel loading and promotes natural regeneration of seral species. The combination of these activities moves the project area toward the desired condition FRCC 1 and increases resilience of treated stands to the effects of wildfire.

2) Treatments to improve riparian vegetation and encourage maintenance and expansion of beaver populations -- Healthy riparian vegetation, particularly in wide lower gradient valleys, such as those found throughout much of the East Fork Sevier River, Upper Kanab Creek and Blubber Creek, can be effective at changing and moderating fire behavior on the landscape (Kauffman, 2001). As streams incise and become disconnected from their floodplains riparian vegetation often converts to more mesic upland vegetation, which is more conducive to carrying fire (Petit & Naiman, 2007). In southern Utah this has been observed many times including the 2002 Sanford fire as pinyon and juniper trees carried fire into the crowns of legacy cottonwood

galleries on the terraces of incised streams and fire traveled down the riparian zone instead of across the uplands. Reconnecting floodplains, elevating the water table and reestablishing wider and healthier vegetation communities should help to restore more natural fire behavior on the landscape.

Water Quality/Quantity:

This project will attempt to improve and increase boreal toad breeding habitat by improving upland and riparian browse, as well as using beaver dam analogues to facilitate maintaining and expanding beaver pond complexes throughout the Headwaters of the East Fork Sevier River and Upper Kanab Creek. Pollock et al. (2015) recently reviewed the beneficial impacts of beaver dam complexes to water quality and quantity. They cite numerous studies indicating that beaver dam complexes can attenuate damaging peak flows, while elevating summer base flows and maintaining higher local water tables. Additionally, the authors cite numerous studies showing the potential for beaver pond complexes to trap large volumes of sediment and retain that sediment long-term, as well as provide wetlands that can act as both sinks and filtering systems for contaminants (Pollock, Lewallen, Woodruff, Jordan, & Castro, 2015). Similar to beaver dams, beaver dam analogues can be expected to trap sediment, slow runoff and raise the local water at least temporarily. If they help to facilitate beaver movement into the areas these benefits may be longer term.

The benefits of healthy riparian vegetation and connected floodplains and wetlands to water quality, as well as water storage and release are well documented. Riparian vegetation buffers can trap sediment during overbank flow events and prevent sediment from overland runoff from reaching stream channels (Belt, O'Laughlin, & Merrill, 1992). Stream bank stability is instrumental in preventing excessive erosion. Willow-sedge communities are among the best for maintaining stream bank stability (Winward, 2000). This project proposes to plant and protect riparian willow communities.

The pond at Blubber Creek is part of an old grade control project to halt large advancing head cuts from moving upstream. As noted elsewhere in the proposal, channel incision and downcutting disconnect streams from their floodplains and lower the water table. This can result in elevated storm runoff and reduced capacity for long-term water storage. The two large grade control structures on Blubber Creek protect and maintain a large wet meadow complex upstream. Repairing the outflow at the lower graded control structure will prevent the structure from failing and maintain the current capacity for water storage upstream.

Aspen and conifer vegetation treatments correspond to the Upper Sevier Watershed Project's recommendations to improve watershed conditions through reducing tree densities, a focus on increasing forest composition of seral tree species (aspen, ponderosa pine, and Douglas-fir), and improving fire and fuel conditions.

Compliance:

Proposed silvicultural treatments and aspen fencing - 2012 Decision Notice and Finding of No Significant Impact for the Paunsaugunt Vegetation Management Project (attached).

Temporary Experimental riparian exclosure fencing -- 7 CFR 1b.3(a)(3) , "Inventories, research activities, and studies, such as resource inventories and routine data collection when such actions are clearly limited in context and intensity." Does not require a Case File or Decision Memo.

Willow planting -- Not applicable.

Experimental Beaver Dam Analogues -- 7 CFR 1b.3(a)(3) , "Inventories, research activities, and studies, such as resource inventories and routine data collection when such actions are clearly limited in context and intensity."

Does not require a Case File or Decision Memo.

Blubber Creek Wildlife Pond outflow channel repair -- Maintenance of existing structure.

Methods:

1) Protecting/improving aspen regeneration/recruitment:

a. Construct wildlife net fence around three completed aspen coppice cuts along Mill Creek adjacent to historic wilderness.

b. Coppice cut - A coppice treatment will be applied to aspen stands, removing all live overstory trees to stimulate aspen sprouting.

c. Shelterwood - A shelterwood preparatory cut is proposed for this stand. The preparatory cut will allow the retained trees to strengthen their wind firmness, develop larger crowns for seed production, and increase growth and vigor. The stand will then be subject to an establishment cut in about 20 years. An establishment cut will remove all overstory trees except seed trees.

2) Protecting and improving native riparian woody browse regeneration/recruitment.

a. East Fork Sevier River - Three temporary experimental riparian fences will be constructed at locations chosen to facilitate expansion of current willow stands by a Dixie national forest Interdisciplinary team and vetted by Regional DWR personnel. Approximately half of each fence will be wildlife net fence and the other half will be 4 strand barbed wire fence. Fences will be kept in place for 5-7 years or until pre-determined objectives for woody browse are met. Woody browse will be monitored annually within each side of the exclosure and evaluated within 5-7 years to determine when the exclosures should be removed.

b. Left Fork Kanab Creek Exclosure -- Temporary wildlife net fence will be constructed within the existing exclosure footprint. The existing livestock exclosure protects 36 acres of mixed upland and riparian habitat. Both aspen and willow regeneration/recruitment have struggled in the exclosure so the net fence will be built around the entire 36 acres using the existing 3,847 feet of 4 strand barbed wire fence and 1,121 feet of buck

and pole fence for support. Once willows have established and got to the desired stem density the wildlife fence will be removed.

c. Willow planting i) Left Fork Kanab Creek exclosure -- using a combination of gas powered augers, post hole diggers and manual insertion methods willows will be planted over approximately 14 acres of stream bank, wet meadow and riparian habitat within the left Fork Kanab creek exclosure. Cuttings will be harvested from other streams within the East Fork Sevier River drainage and planted every 6-12 feet depending on the habitat. Denser planting will be made closer to the streams and wet areas, while areas further from water will be planted less densely. Three stems will be planted per hole. ii) Upper Kanab Creek, Middle Kanab Creek

3) Maintaining and improving Left Fork Kanab Creek breeding area for boreal toad -- Using a Hydraulic post pounder (see attachments and budget) posts will be placed vertically along the downstream base of the upper, largest inactive beaver pond in the Left Fork Kanab Creek exclosure spaced 0.5-1.0 m apart (Pollock, Lewallen, Woodruff, Jordan, & Castro, 2015). Slash and willow cuttings placed and woven between the posts.

4) Slowing channel erosion/incision and reconnecting the floodplain on the East Fork Sevier River near the Mill Creek and Seiler creek confluences -- A "starter dam" type beaver dam analogue will be constructed at each location using a Hydraulic post pounder (see attachments and budget) posts will be placed vertically along the downstream base of the upper, largest inactive beaver pond in the Left Fork Kanab Creek exclosure spaced 0.5-1.0 m apart (Pollock, Lewallen, Woodruff, Jordan, & Castro, 2015). Slash and willow cuttings will be placed and woven between the posts and silt sand cobble and other substrate may be placed on the upstream side to reduce permeability.

5) Maintaining grade control and establishing vegetation on Blubber Creek outflow structure.

a. Grade control -- Using an excavator and dump truck transported boulder reconstruct 6 rock weir grade control structures damaged by monsoonal flooding, including building larger wing walls to reduce chances of structure failure.

b. Vegetation reestablishment -- Use an excavator to rebuild and reshape bankfull sills to specification. Repair and replace coconut matting and hay bales. Replant willow along approximately 500 feet of stream with holes spaced at 6-8 foot center and three stems per hole along the stream and at approximately 6-8 feet back from the stream. Reseed sills and contoured bank where necessary.

Monitoring:

Willow planting success -- Visual surveys will evaluate planting success rates and repeat photography will document success in each planting area. Additionally, a Riparian Level III Inventory was established in the Left Fork Kanab Creek in 2014 and will document the trend in riparian vegetation pre- and post-planting (Winward, 2000). Before and after summaries will be developed and posted to the WRI web site.

Willow regeneration in temporary, experimental riparian exclosures -- One of the goals of these exclosures is to evaluate the potential for temporary livestock or livestock and wildlife exclosures to jump start riparian woody browse regeneration to the point that it may become self-sustaining. Dixie National Forest personnel are currently developing woody species objectives for these exclosures. A monitoring strategy for woody species will accompany these objectives. A report documenting the success of the temporary exclosures will be compiled and posted to the WRI web site.

Riparian vegetation -- Within the East Fork Sevier drainage upstream from Tropic Reservoir the Dixie National Forest has established 24 Riparian Level III inventories (Winward, 2000). The inventories monitor trend in vegetation composition along the greenline throughout the drainage and will help to evaluate changes in riparian vegetation composition along with repeat photography. As discussed above one of the inventory locations is within the Left Fork Kanab Creek exclosure. Additionally there is an inventory location on the Middle Fork of Kanab Creek just upstream from the proposed willow planting, Mill Creek immediately adjacent to three of the proposed aspen fencing units and the East Fork Sevier River in between one of the proposed temporary experimental exclosures and the proposed beaver dam analogue location near the Seiler Creek confluence. Results of riparian inventories are detailed in annual monitoring reports by the Dixie National Forest and can be uploaded to the WRI web site (see attachments).

Bank stability -- Dixie National Forest personnel have also begun collecting data on bank stability, bank cover and greenline to greenline width using the Multiple Indicator Monitoring protocol (Burton, Smith, & Cowley, 2011). Bank stability, bank cover and greenline to greenline width have been evaluated at 16 of the Riparian Inventory locations upstream from Tropic Reservoir including the location on Mill creek near three of the proposed aspen fencing units and the East Fork Sevier River in between one of the proposed temporary experimental exclosures and the proposed beaver dam analogue location near the Seiler Creek confluence. Bank stability, bank cover and greenline to greenline width will be evaluated at the Inventory location with the Left Fork Kanab Creek exclosure prior to project activities commencing, as well as at the locations on the Middle Fork of Kanab Creek. MIM transects will be established on Upper Kanab Creek within the area to be planted and below the head cut, as well as at the two beaver dam analogue locations on the East Fork Sevier. Results of Partial MIM monitoring are detailed in annual monitoring reports by the Dixie National Forest and can be uploaded to the WRI web site (see attachments).

Boreal toad breeding/breeding habitat -- UDWR and Dixie National Forest personnel conduct annual breeding and inventory surveys for boreal toad on the Paunsaugunt Plateau. The Left Fork Kanab Creek exclosure (including the areas to be planted and the pond where the beaver dam analogue will be installed), multiple locations along the East Fork Sevier River and the Blubber Creek ponds have been surveyed annually for 15-20

years (Golden, 2012; Rodriguez, 2012; Wheeler K. , Fridell, Swensen, & Golden, 2015). These surveys will continue and will be expanded to include the temporary riparian exclosures and beaver dam analogue projects outlined in this proposal. The results of these surveys are detailed in annual reports which can be posted to the WRI web site (see attachments).

Aspen regeneration - During harvest and other proposed activities, MDF and USFS sale administrators and inspectors will be monitoring contractors for adherence to contract specifications and soil and water conservation best management practices. This allows for either prevention or immediate mitigation of damage to forest resources. The Utah Division of Wildlife regularly conducts mule deer and elk population estimates in and surrounding the project area. Within aspen and conifer regeneration treatment areas, stocking surveys are conducted following the first, third, and fifth growing seasons as directed in Forest Service Handbooks.

Adaptive management actions are defined within the project's Decision Notice to assure satisfactory stocking.

Partners:

This project is a cooperatively planned effort between the Dixie National Forest, UDWR and UDNR. Ideas for short-term actions to benefit boreal toad were developed collaboratively through both interagency and interdisciplinary teams in the autumn and early winter 2015.

The proposed activities were discussed with the Paunsaugunt Plateau Conservation Partners (Colorado Parks & Wildlife, Utah's Hogle Zoo, Denver Zoo, Omaha's Henry Doorly Zoo and Aquarium, Loveland Living Planet Aquarium, Bryce Canyon National Park) at their annual meeting on December 1, 2015, as well as with the State of Utah Boreal Toad Conservation team at their annual meeting on December 10, 2015. Both these groups are supportive of the short-term actions outlined in this proposal.

The Mule Deer Foundation is a partner with this project. The project meets the objectives and mission of the Mule Deer Foundation to improve habitat for mule deer. The Mule Deer Foundation is providing cash funds, and project management.

The project area is adjacent to Bryce Canyon National Park. The Park Service was consulted regarding activities proposed. The proposed logging methods used to manage the conifer and aspen stands slated for treatment are not consistent with Park Service direction and the project was not expanded to include the Park Service.

Future Management:

After the Paunsaugunt Plateau and the headwaters of the East Fork Sevier River suffered severe overgrazing in the early 1900s these watersheds have been the focus of restoration work to control erosion and restore upland and riparian vegetation for over 70 years. From early contour furrow and grade control structures to more recent designated dispersed camping road closures, aspen regeneration riparian exclosures and aquatic organism passage projects. In 2013 and 2014 alone the Dixie National Forest spent over \$1,000,000 on watershed improvements in the drainage upstream from Tropic Reservoir. The largest grazing allotment on in the East Fork Sevier watershed upstream from Tropic Reservoir is set up to succeed as much or more than any allotment on the Dixie National Forest. Livestock move through 8 pastures from June through October, never spending more than 3 weeks in any one pasture. Riparian trend data show vegetation meeting Forest Plan objectives and maintaining a stable or upward trend. The Powell Ranger District is in the process of developing a vegetation management plan for the Paunsaugunt Plateau, which will give an interdisciplinary team, including wildlife and fish biologists the opportunity to identify key stands in need of woody browse improvements.

Additionally, UDWR and the Dixie National Forest are in the process of developing a Conservation Action Plan for the Paunsaugunt Plateau population of boreal toad. The actions identified in this project are all in the draft version of this Action Plan, which will also contain long-term actions that build on the success of the proposed project. The action plan will also address monitoring success and future efforts to expand boreal toad through captive rearing and possibly captive breeding. The actions identified in this proposal are part of a coordinated effort to manage habitat on the Paunsaugunt Plateau, now and in the future, with a focus on boreal toad and other wildlife species.

Along those same lines UDWR and the Dixie National Forest are in the preliminary stages of planning a large scale restoration project in the East Fork Sevier drainage upstream from Tropic Reservoir for Bonneville cutthroat trout, southern leatherside and other non-game fish native to the Bonneville Basin. As signatories to the Conservation Agreement and Strategies for both Bonneville cutthroat trout and southern leatherside, the Forest Service, in cooperation with DWR, will certainly be continuing to focus on watershed restoration and the health of aquatic and riparian habitat in these watersheds for decades to come.

Domestic Livestock Benefit:

The projects within this proposal all fall on active cattle allotments on the East Fork/Crawford/Robinson/Lower Blubber, Kanab Creek and Upper Blubber allotments. In the short-term the 86 acres of aspen regeneration and 15 acres of temporary riparian exclosures will be unavailable for browsing and grazing by domestic ungulates; however, after the objectives are met these exclosures will be removed. The thinned forested stands would be expected to have an increase in quantity and quality of grass, forb, brush, and aspen understories allowing for improved forage and cover for livestock and wildlife. The environmental analysis has determined that the proposed silvicultural treatments will help disperse livestock better throughout the pastures and relieve grazing pressure within the heavier used areas of the pastures. The riparian areas should also have improved browse and forage value for wildlife and livestock following fence removal.

Maintaining and enhancing the current beaver population, along with the proposed beaver dam analogues

should also increase forage for domestic livestock on the allotments in question by reconnecting the floodplain and raising the water table which will expand the amount and area of high quality riparian forage. In addition to forage improvements avoiding potential federal listing of the Paunsaugunt population would allow for management of the Paunsaugunt Plateau to continue as multiple use. Federal listing could place additional restrictions on management activities such as livestock grazing.

BUDGET		WRI/DWR	Other	Budget Total	In-Kind Total	Grand Total
		\$198,462.97	\$26,596.00	\$225,058.97	\$61,441.15	\$286,500.12
Item	Description	WRI	Other	In-Kind	Year	
Contractual Services	Wildlife fencing contract aspen regeneration - 18,064 feet @\$5.15/ft, MDF logging costs for stands completed in 2015 to be fenced in this proposal was \$79,197	\$93,030.0	\$0.00	\$9,116.00	2017	
Contractual Services	Site Preparation-Aspen Natural Regeneration 31 ac @ \$229/ac	\$3,103.00	\$3,996.00	\$0.00	2017	
Equipment Purchase	Hydraulic Post Driver with 4.25" chuck,hoses,hydraulic oil,and Mobile diesel or gas operated hydraulic Power Pack. For building beaver dam analogues.Housed by UDWR-GBRC and can be used statewide. See video: https://www.youtube.com/watch?v=XpAISNOV9yo	\$11,000.0	\$0.00	\$0.00	2017	
Personal Services (seasonal employee)	2 to 3 Seasonal UDWR employees to assistance in willow planting and beaver dam analogue installation.	\$0.00	\$0.00	\$1,250.00	2017	
Personal Services (permanent employee)	2 to 4 UDWR permanent employees to assist in willow planting and beaver dam analogue installation.	\$0.00	\$0.00	\$2,500.00	2017	
Contractual Services	4 weeks of an 8 person UCC/ACE crew at (\$5,800/week) to complete willow stem collection and planting	\$23,200.0	\$0.00	\$5,800.00	2017	
Contractual Services	Temporary experimental riparian fencing contract - 4,117 feet of 4 strand barbed wire fence at \$3.15/ft and 3,642 feet of wildlife net fence at \$5.15 foot	\$31,724.8	\$0.00	\$0.00	2017	
Contractual Services	Machine Piling- Surface Fuels 59 ac @ \$575/ac	\$16,225.0	\$17,700.0	\$4,425.00	2017	
Contractual Services	Precommercial thinning 28 ac @ \$235/ac	\$2,380.00	\$4,200.00	\$1,150.00	2017	
Materials and Supplies	Gas and diesel for hydraulic post pounder and gas-powered augers	\$500.00	\$0.00	\$0.00	2017	
Equipment Rental/Use	2-man Auger rental @\$356 per week, 4 augers for 4 weeks (2 FS, 2 DWR)	\$0.00	\$0.00	\$5,696.00	2017	
Equipment Rental/Use	Excavator 110 miles at \$13.36/mile (Blubber Creek repair)	\$1,469.60	\$0.00	\$0.00	2017	
Equipment Rental/Use	Dump truck 500 miles at 1.76/ mile (Blubber Creek rebuild)	\$880.00	\$0.00	\$0.00	2017	
Motor Pool	Pilot car - 3 cars at \$400/per car (Blubber Creek rebuild)	\$1,200.00	\$0.00	\$0.00	2017	
Personal Services (seasonal employee)	2 Equipment operators (totaling 21 days), GS4 seasonal laborer totaling 10 days (Blubber Creek rebuild)	\$5,126.52	\$0.00	\$0.00	2017	
Personal Services (permanent employee)	2 Forest engineers totaling 9 days, Forest hydrologist 7 days (Blubber Creek rebuild)	\$0.00	\$0.00	\$5,825.00	2017	
The original rebuild completed in 2014						

Item	Description	WRI	Other	In-Kind	Year
	and then damaged by flooding in cost the Forest Service \$64,308.				
Motor Pool	2 Small pick up trucks 300 miles at @ 0.49/MILE 1 large diesel 200 miles @ 0.77/mile (Blubber Creek rebuild)	\$224.00	\$0.00	\$224.00	2017
Materials and Supplies	Erosion control matting, rebar, hay bales, boulders, seed.	\$0.00	\$700.00	\$0.00	2017
Personal Services (permanent employee)	Forest fish biologist, Wildlife Biologist and Hydrologist 15 days each to inspect and assist with willow plantings, riparian fence contract and beaver dam analogue installation	\$0.00	\$0.00	\$17,055.1	2017
Personal Services (permanent employee)	Mule Deer federation salary and admin costs (aspen coppice, fencing, shelterwood Harvest)	\$5,600.00	\$0.00	\$0.00	2017
Personal Services (permanent employee)	FS salary and administration for aspen coppice harvest and fence, shelterwood harvest and machine piling	\$0.00	\$0.00	\$5,600.00	2017
Personal Services (seasonal employee)	FS salary and administration for aspen coppice harvest and fence, shelterwood harvest and machine piling	\$2,800.00	\$0.00	\$2,800.00	2017

FUNDING	WRI/DWR	Other	Funding Total	In-Kind Total	Grand Total
	\$208,462.97	\$700.00	\$209,162.97	\$61,441.15	\$270,604.12

Source	Phase	Description	Amount	Other	In-Kind	Year
Federal Aid (PR)			\$36,347.2	\$0.00	\$0.00	2017
ESMF	IE092		\$8,900.12	\$0.00	\$0.00	2017
Hogle Zoo	N669		\$10,000.0	\$0.00	\$0.00	2017
USFS-WRI		USFS underfunded - was \$150k	\$130,000.	\$0.00	\$0.00	2017
USU		UCC	\$0.00	\$0.00	\$5,800.00	2017
DWR			\$0.00	\$0.00	\$6,598.00	2017
USFS			\$0.00	\$700.00	\$49,043.1	2017
DNR Watershed	N362		\$23,215.6	\$0.00	\$0.00	2017

EXPENSE	WRI/DWR	Other	Expense Total	In-Kind Total	Grand Total
	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

Source	Phase	Description	Amount	Other	In-Kind	Year
Federal Aid (PR)		N/A	\$0.00	\$0.00	\$0.00	
ESMF	IE092	N/A	\$0.00	\$0.00	\$0.00	
Hogle Zoo	N669	N/A	\$0.00	\$0.00	\$0.00	
USFS-WRI		N/A	\$0.00	\$0.00	\$0.00	
USU		N/A	\$0.00	\$0.00	\$0.00	
DWR		N/A	\$0.00	\$0.00	\$0.00	
USFS		N/A	\$0.00	\$0.00	\$0.00	
DNR Watershed	N362	N/A	\$0.00	\$0.00	\$0.00	

SPECIES		
Species	"N" Rank	HIG/F Rank

Species	"N" Rank	HIG/F Rank
Mule Deer		1
Threat		Impact
Improper Grazing – Livestock (current)		Low
Inappropriate Fire Frequency and Intensity		High
Elk		2
Threat		Impact
Not Listed		NA
Southern Leatherside Chub	N2	N/A
Threat		Impact
Channel Downcutting (indirect, unintentional)		Medium
Improper Grazing – Livestock (current)		Medium
Increasing Stream Temperatures		Medium
Sediment Transport Imbalance		Low
Bonneville Cutthroat Trout	N4	1
Threat		Impact
Channel Downcutting (indirect, unintentional)		High
Improper Grazing – Livestock (current)		High
Increasing Stream Temperatures		High
American Beaver		N/A
Threat		Impact
Not Listed		NA
Brook Trout		4
Threat		Impact
Not Listed		NA
Brown Trout		2
Threat		Impact
Not Listed		NA
Western Toad	N4	N/A
Threat		Impact
Improper Forest Management		Medium
Improper Grazing – Livestock (current)		High
Inappropriate Fire Frequency and Intensity		Low
Small Isolated Populations		High
Northern Leopard Frog	N5	N/A
Threat		Impact
Channel Downcutting (indirect, unintentional)		Medium
Improper Grazing – Livestock (current)		Low
Inappropriate Fire Frequency and Intensity		Low

Species	"N" Rank	HIG/F Rank
Threat		Impact
Sediment Transport Imbalance		Low

HABITATS

Habitat		
Aquatic-Forested		
Threat		Impact
Channel Downcutting (indirect, unintentional)		High
Improper Grazing – Livestock (current)		Medium
Sediment Transport Imbalance		Medium
Aspen-Conifer		
Threat		Impact
Improper Forest Management		High
Improper Grazing – Livestock (current)		High
Improper Grazing – Livestock (historic)		Very High
Problematic Animal Species – Native		Medium
Emergent		
Threat		Impact
Channel Downcutting (indirect, unintentional)		Medium
Improper Grazing – Livestock (current)		Low
Riverine		
Threat		Impact
Channel Downcutting (indirect, unintentional)		High
Improper Grazing – Livestock (current)		High
Sediment Transport Imbalance		Medium

PROJECT COMMENTS

Comment	02/12/2016	Type: Project	Commenter Vicki Tyler
Awesome project with immediate ecological need! Where are the rest of the Beaver? A later introduction into some of this?			
Comment	02/18/2016	Type: Project	Commenter Michael Golden
Hey Vicki. Thanks for the comment. Right now the beaver from the 2012 reintroduction have done a pretty good job at spreading out over several miles of the upper East Fork and we have had some beaver move in elsewhere in the drainage. Until we can get some more woody browse going in some of the other key areas almost everyone involved is a little leery at additional reintroductions. Some fear that ungulates and beaver may be too much for some areas to sustain currently. Hence the planting and hopes to jump start some aspen and willow in key spots. If the temporary fencing works well we will be looking at ways to rotate it around and expand on the healthy willow communities we do have. The Powell Ranger District is also starting internal work on a large scale vegetation management project that would encompass the entire Paunsaugunt and I am hopeful we can get some more targeted aspen treatments to increase beaver food. Be happy to chat with you about it further.			

Comment	02/19/2016	Type: Project	Commenter Michael Golden
All that being said about beaver, we are still actively partnering with DWR (Heather and Josh) to use non-lethal solutions to infrastructure issues and supplement the beaver populations where and if necessary. We are considering some additional reintroductions on some tributaries just being cautious.			
Comment	02/29/2016	Type: Financial	Commenter Alan Clark
Any alternative to purchasing the hydraulic post driver. Can it be rented to lower cost for this project?			
Comment	02/29/2016	Type: Financial	Commenter Tyler Thompson
Also wondering if UCC has one already? Have they just been hand pounding them in?			
Comment	02/29/2016	Type: Financial	Commenter Michael Golden
<p>Hey guys,</p> <p>So I had DWR help me with this component of the project and my understanding was that there was an interest in purchasing a State-wide hydraulic post-pounder. I have had some conversation via the WRI comment process with Clint Wyrick and Dan Fletcher, both of whom also have projects that would involve using a hydraulic post-pounder. Clint said that he was planning on using one that the Southeast Region of DWR owns/houses and Dan thought that Justin Jimenez had access to or owned one at the State BLM level. I would suggest that maybe we all discuss this tomorrow and determine what the best course of action is. A rental option works just as well for the specific project purposes and I anticipate we could use costs similar to those outlined in Dan's or Clint's proposal to guesstimate that cost of that rental.</p>			

COMPLETION

Start Date:

End Date:

FY Implemented:
2017

FY Completed:

Final Methods:
N/A

Project Narrative:
N/A

Future Management:
N/A

Map Features

ID	Feature Category	Action	Treatment/Type
435	Fence	Construction	Net wire
436	Fence	Construction	Barbed wire
970	Other point feature	N/A	N/A

ID	Feature Category	Action	Treatment/Type
5002	Aquatic/Riparian Treatment	Vegetation Improvements	Pole planting/cuttings
5003	Affected Area	N/A	N/A
5032	Terrestrial Treatment Area	Forestry practices	Coppice cutting
5033	Terrestrial Treatment Area	Forestry practices	Group selection cuts